

CLAIMS

1. Method of assistance in starting a vehicle comprising a power unit and an Automatic Parking Brake equipped with a means of executing a command to release or deactivate the Automatic Parking Brake, characterized in that it consists in executing, at least after one starting phase of the power unit:

- A stage of estimation of a transmitted torque value which balances the vehicle on the slope;
- A loop consisting in executing an incremental calculation of an estimation of the torque really transmitted at a given moment, while the estimation of the torque really transmitted is insufficient to surpass the estimation of the torque transmitted; then
- A stage of production of a starting or deactivation command of the Automatic Parking Brake.

2. Method according to Claim 1, characterized in that the stage of estimation of a transmitted torque value which balances the vehicle on the slope includes a stage for calculating a static model of the vehicle on the slope from a measurement of an angle of inclination delivered by a slope sensor (7) and knowledge of a given value representative of the transmission speed;.

3. Method according to Claim 2, characterized in that, the measurement of an angle of inclination being less than a given threshold, the estimation of a transmitted torque value which balances the vehicle on the slope is increased by a given value.

4. Method according to Claim 3, characterized in that the given value of increase of the estimation of a transmitted torque value which balances the vehicle on the slope depends on measurement of the angle of inclination.

5. Method according to Claim 1, characterized in that the stage of incremental calculation (32) comprises:

- a stage of reading of an effective average torque value (C_{me}) associated with the dynamic stage of the power unit;
- a stage of reading of an engine speed value (W_m);
- a stage of calculation of the time derivative of the engine speed;
- a stage of determination of the moment of inertia of the power unit (J_{mot}) and of calculation of the load moment in the form of a product of the moment of inertia of the power unit by the time derivative of the engine speed
- a stage of determination of an estimation of transmitted torque according to an equation of the form: $ECT = C_{me} - J_{mot} \times dW_m/dt$.

6. Method according to Claim 5, characterized in that it includes a stage of resynchronization of the reading of an effective average torque value (C_{me}) and an engine speed value (W_m), so that each pair of values (C_{me} , W_m) corresponds to the same time interval.

7. Method according to Claim 6, characterized in that it consists in adding a predetermined delay, preferably equal to three periods of passage to the Top Dead Center of the thermal engine of the power unit, on the value of resynchronization of the estimated average torque value, in order to take into account notably the waiting time for filling of the manifold and for ignition.

8. Method according to Claim 6 or 7, characterized in that the resynchronization stage consists in applying the resynchronization on the derivative value (D_{W_m}) of the engine speed (W_m) between two samples separated by a resynchronization time notably according to the equation: $D_{W_m} = [W_m(8) - W_m(1)]/\text{time}$, in which "time"

determines the resynchronization period and $Wm(1)$ and $Wm(8)$ the values of beginning and end of the resynchronization period.

9. Method according to one of Claims 5 to 8, characterized in that the transmitted torque estimation stage (ECT) comprises:

- a stage (S4) of comparison of a transmitted torque estimation value (ECT) to a predetermined threshold value (ECTthreshold);
- if the predetermined threshold value (ECTthreshold) is exceeded, a test stage (S5) of the output value of a counter (S3), incremented on each transmitted torque estimation stage (ECT) relative to a predetermined threshold value (Smin_loop_Delay),
- if the predetermined threshold value (Smin_loop_Delay) is exceeded, a stage of production of a command authorizing release of the Automatic Parking Brake.

10. Method according to Claim 9, characterized in that the transmitted torque estimation stage ECT further comprises a stage for executing a predetermined offset, so as to reduce the disturbing effect of starting and/or stopping of some secondary consumers (Consumers) of energy or power supplied by the thermal engine, by carrying out the operation:

$$ECT_Corr_k = ECT_k + g(Consumers)$$

A prior stage for determining a range in which the engine can be considered idling and a range during which an offset $g(Consumers)$ on the transmitted torque estimation can be executed.

11. Method according to Claim 10, characterized in that the stage for executing an offset is carried out following a test (103) in the course of which four conditions are combined:

$$Wm \leq Smax_Wm_Idle$$

$$ABS(D_Wm) \leq Smax_D_M_idle$$

$$THETA_Acc \leq Smax_acc_idle$$

$$D_Acc = 0.$$

conditions under which:

Smax_Wm_idle represents a threshold value below which the engine speed indicates that the engine is at rest or idling;

Smax_D_M_idle represents a threshold value below which the absolute value ABS(D_Wm) of the time derivative of the engine speed D_Wm indicates that the engine is at rest or idling;

Smax_acc_idle represents a threshold value below which the degree of depression of the accelerator pedal THETA_Acc indicates that the engine is at rest or idling;

D_Acc represents the time derivative of the degree of depression THETA_Acc of the accelerator pedal, which is negative when the driver lifts his foot from the accelerator pedal;

so that, if the test (103) is negative, the control returns to initialization (102) of a counter (CPTR), the power unit being deemed unconnected to the driving wheels;

and so that, if the test (103) is positive, the control passes to a test (104) where one looks whether the counter (CPTR) is below a predetermined threshold value (CPTR_threshold);

so that if the test (104) is positive, the control passes to a stage (105) in the course of which an initially zero "offset" value, when the counter (CPTR) is itself initialized at the stage (102), is increased by the value of the current estimation ECT;

then, the value of the counter (CPTR) being incremented by one step on a stage (106), and the control returning to the test stage (103);

so that, if the test (104) is negative, the offset value is transmitted to a routine (107) of calculation of an offset value of the transmitted torque estimation ECT, an offset value noted "offset_ECT", which is equal to the ratio of the "offset" value calculated on the stage (105) to the value CPTR_threshold of the counter.

12. Method according to one of the foregoing claims, characterized in that it comprises a stage for producing a driver activity report, so that release of the Automatic Parking Brake will be refused in case of lifting of the accelerator pedal.

13. Method according to one of the foregoing claims, characterized in that it comprises a stage for detecting a release demand when the power unit is not engaged.

14. Method according to Claim 13, characterized in that the stage consists, without using any sensor of depression of the clutch pedal, in detecting the engaged state by means of two maps of the estimation of torque transmitted as a function of the degree of depression of the accelerator pedal respectively established when the wheels are engaged and when the wheels are disengaged and comparing the value of the estimation of torque transmitted to each of the map values addressed by measurement of the degree of depression of the accelerator pedal in order to produce, if comparison to the first map is positive, a characteristic report of a disengaged state, and if the comparison to the second map is positive, to produce a characteristic report of an engaged state.

15. Method according to Claim 13, characterized in that the stage consists in using a sensor of depression of the all-or-nothing clutch pedal to produce a characteristic report of an engaged or disengaged state.

16. Method according to any one of the foregoing claims, characterized in that it comprises a stage for detecting idling speed, which consists in:

- comparing the information on estimated engine torque (C_{me}) to two functions of estimation of idling speed in rotation with an estimation of positive transmitted torque $f_p()$ and in rotation with an estimation of negative transmitted torque $f_n()$;
- applying to function $f_p()$ an idle gain ($G_{C_{me_PV}}$) applied on the estimated engine torque (C_{me}), an offset ($Offset_{C_{me_PV}}$) on the estimated engine torque value in idle position, and the current value (C_{ME}) in order to produce a priori an idling speed value in rotation with an estimation of positive transmitted torque;
- applying to function $f_n()$ an idle gain ($G_{C_{me_NV}}$) applied on the estimated engine torque (C_{me}), an offset ($Offset_{C_{me_PV}}$) on the estimated engine torque value in idle position, and the current value (C_{ME}) in order to produce a priori an idling speed value in rotation with an estimation of negative transmitted torque;;
- comparing the engine speed value (W_m) to determine whether a positive or negative idling speed is present, on rotation with an estimation of positive transmitted torque or with an estimation of negative transmitted torque;
- authorizing release of the Automatic Parking Brake only if no idling speed is detected.

17. Method according to one of the foregoing claims, characterized in that it comprises a stage of saturation detection of the high-speed thermal engine, so that release of the Automatic Parking Brake is prevented on saturation.

18. Method according to one of the foregoing claims, characterized in that it comprises a stage for producing a "horizontal" starting operation without threshold on pressing the accelerator pedal, which consists in:

- producing a parking brake release command on the sole determination that the transmitted torque estimation ECT is higher than the predetermined threshold ECTthreshold and, in particular, without testing a threshold on pressing the accelerator pedal;
- initializing a state variable on starting up the vehicle in order to indicate that the accelerator pedal has not yet been depressed, the variable being represented by `Acc_Was_NonZero = 0`;
- reading a variable representative of the state of rest of the engine (Idle);
- treating the variable `Acc_Was_NonZero` so that it stays at "1" as soon as the accelerator has been pressed and until the Idle variable returns to "1";

and then consists in authorizing "horizontal" starting when the variable `Acc_Was_NonZero` equals "0" and testing that the transmitted torque estimation ECT is higher than a threshold value ECTthreshold in order to authorize release of the Automatic Parking Brake and thus ensure starting of the vehicle keeping it in a certain range of acceleration.

19. Method according to Claim 18, characterized in that it consists in extending the "horizontal" starting operation to a descending starting operation in first gear.

20. Method according to Claim 18, characterized in that it consists in extending the "horizontal" starting operation to a descending starting operation in reverse gear.

21. Method according to one of the foregoing claims, characterized in that it comprises an excess pitch detection stage and a stage for preventing release of the Automatic Parking

Brake in a starting situation if the pitch of the vehicle applied, for example, by too great a movement of the passengers in the vehicle exceeds a certain predetermined threshold.

22. Method according to one of the foregoing claims, characterized in that it comprises a stage for determining a term of anticipation on the release command of the Automatic Parking Brake dependent on predetermined anticipation values, which consists, upon elaboration of the Automatic Parking Brake release command, in also executing a stage of measurement of the degree of depression of the accelerator pedal Θ_{Acc} , and then measuring a time derivative of the signal Θ_{Acc} of the degree of depression, that is, D_{Acc} , and of comparing that instantaneous derivative value D_{Acc} with a predetermined threshold $Threshold_Anticipate$, so that if the rate of variation of the degree of depression D_{Acc} is greater than a $Threshold_Anticipate$ value, the incrementation loop of the transmitted torque estimation value ECT will be interrupted before the test (33; Figure 2) is real and in order to produce in advance the Automatic Parking Brake release command.

23. Device to assist on-hill starting of a vehicle containing a power unit and an Automatic Parking Brake equipped with a means (7, 8) of executing a parking brake release or deactivation command using the method according to at least one of the foregoing claims, characterized in that it contains a computer (5) of a release command connected to a sensor (7) of the degree of slope on which the vehicle is engaged and to a sensor delivering information on the speed or rate of rotation of the power unit of the vehicle, and characterized in that the computer (5) contains a means of estimation of the transmitted torque (ECT) connected to a first input of a means of comparison, the second input of which is connected to means for producing a transmitted torque threshold value corresponding to maintenance of the vehicle, so that an

output terminal of said means of comparison will produce a release command (11) addressed to the electric parking brake (7, 8).

24. Device according to Claim 23, characterized in that it contains:

- a first reading module of the effective average torque C_{me} supplied by the computer (3) of the engine in the form of information circulating on the bus (1) of the vehicle,
- a second reading module of the instantaneous speed W_m of rotation of the thermal engine supplied by the computer of the engine (3) in the form of information circulating on the bus (1) of the vehicle,
- a third module making it possible to calculate the time derivative dW_m/dt of the rate of rotation on output of the power unit from the datum of rate of rotation or engine speed retrieved by the second module;
- a fourth module for calculating the product of a value of the moment of inertia J_{mot} characteristic of the inertia of the engine, as well as the output value of said third module;
- a fifth module for subtracting the output value of the fourth module, presented at a subtraction input of the fifth module, from the output value of the said first module, so that on its output an instantaneous value of the instantaneous estimation of transmitted torque produced is presented according to an equation: $ECT = C_{me} - J_{mot} \times dW_m/dt$.

25. Device according to one of Claims 23 or 24, characterized in that, the values of estimated engine torque (C_{me}) and engine speed (W_m) being supplied on fields of a bus (1) by a computer controlling the engine (3), it contains a resynchronization circuit (67).

26. Device according to Claim 25, characterized in that the resynchronization circuit (67) has:

- a memory containing a table on a cycle of pairs of output data, so that the serial number of a value representing the first word received on its first input is associated with a serial number of a value representing the serial number of a second word received,
- registers of sequences of successive values of the first word and/or of the second word and
- a means, dependent on associations of serial numbers of the aforesaid memory, for applying on output a pair of a first word and a second word corresponding to one and the same moment of calculation and for presenting the pair of resynchronized words at outputs terminals (68, 69).

27. Device according to Claim 25 or 26, characterized in that the resynchronization circuit (67) works essentially on the engine speed and makes it possible to use an offset in the mechanism making pairs of words (Cme, Wm) available, a characteristic effect on acceleration of the thermal engine and containing

- a synchronization register (70) of the transmitted torque estimation (Cme);
- a sequencer (71) which receives a signal (56) indicating the high dead center and which transmits writing commands (72) and reading commands (73) to the register (70);
- a register (74) of an available value of estimation of the synchronized transmitted torque;
- a batch (76) of registers in which there is maintained a plurality of successive values of the engine speed (Wm) acquired at successive instants on the CAN bus (1);
- a differentiating circuit (79) which contains:
 - a positive input connected to the reading output of the batch (76) on which the oldest value of the engine speed Wm maintained in the batch (76) is available, and

- a negative input to which the most recent value of the engine speed also available on the input terminal (66) of the module (67) is connected;
- an input (80) which receives a value representing "time" of the time elapsed on acquisition between the oldest value and the most recent value, so that, at the output (81) of the differentiating circuit (79), a value representing a synchronized value of the average time derivative of the engine speed will be available according to an equation of the form:

$$D_Wm_{sync} = [Wm(8) - Wm(1)]time;$$

Loaded in a register (82).

28. Device according to Claim 27, characterized in that a writing command terminal of the register (82) maintaining a synchronized value of the average time derivative of the engine speed is connected to the sequencer (71), which manages a register (86) in which a time offset or delay value ΔT is registered, which corresponds to a desired delay in transmission of values synchronized with the rest of the estimator, so that one can take into account notably:

- the time of filling of the manifold of the thermal engine, and
- the time of ignition when the thermal engine is in acceleration phase, as is the case of on-hill starting.

29. Device according to Claim 24, characterized in that it contains a counter (90) which maintains a numeric value CPTR and updates it on each event presented at its input noted "+" by increasing it by a predetermined value like "1";

an input (91) on which is loaded the value ECT_k, a value in the course of incrementation of the transmitted torque estimation and which is connected, on the one hand, to

the input of a circuit (93) detecting the arrival of a value ECT_k and to a first input of a comparator (92);

the detection output of the module (93) for detection of arrival of a sample ECT_k is connected to the incrementation command input '+' of the counter (90), the reading output terminal of which is connected to a first input of a comparator (93);

a register (94) containing a threshold value ECT_{threshold} and transmitted to a second input of the comparator (92);

the comparator (92) contains a first output (96) and a second output (95), complementing one another, so that if the test carried out by the comparator (92) is positive, the first output (96) passes to the active state and is connected to a first input of an AND gate (97), while the second output (95) passes to the inactive state and is connected to an input terminal for reset to an initial value like the value '0' of the counter (90);

a second comparator (98), a first input of which receives the counting value CPTR available in the counter (90) and a second input of which is connected to a register (99) maintaining the maximum counting value, at the end of which the release authorization can be executed;

so that, when the test carried out by the second comparator (98) is positive, its output passes to the active state and is connected to a second input of the AND gate (97), so that the output (100) of the AND gate (97) passes to the active state to indicate an authorization of release of the Automatic Parking Brake.

30. Device according to Claim 29, characterized in that it includes a register (99) containing a value (Smin_Lop_Delay) determined as a function of the period of sampling or loop rate and of the time or delay desired between the first overshooting by the estimated transmitted

torque value ECT of the threshold value $ECT_{\text{threshold}}$ and execution of the release command of the parking brake FPA, the register (99) containing a means of writing of a value so determined of $S_{\text{min_Lop_Delay}}$, which is activated on initialization of the vehicle or else on its manufacture or on its maintenance by means of a production tool known to the expert, or else on detection of one type of driver made by means of the vehicle's computer 1 which transmits over the bus 1 a characteristic value of $S_{\text{min_Lop_Delay}}$ associated with the driver detected, for example, by means of the ignition key or of the type of driver according to an algorithm of the type of driving carried out by the driver.

31. Device according to Claim 30, characterized in that, by means of an adder performing the operation: $ECT_{\text{Corr_k}} = ECT_k + g(\text{Consumers})$, the transmitted torque estimation value ECT received at the terminal (91) further receives an offset predetermined so as to reduce the disturbing effect of starting and stopping by some secondary consumers of energy or power supplied by the thermal engine, an offset carried out upstream from the circuit (91) of detection and input of the comparator (92)

32. Device according to Claim 31, characterized in that it contains a circuit for executing an offset according to the state of idling or load.

33. Device according to one of Claims 23 to 32, characterized in that it contains a circuit (150 – 172) for detecting the activity of the driver by means of two comparators (151, 152) of the time derivative (D_{Acc}) of the degree of depression of the accelerator pedal at an interval of degree of depression ($S_{\text{MIN_D_Acc_Takeoff}}$, $S_{\text{MAX_D_Acc_Takeoff}}$) in two registers (153, 154) and by means of an AND gate (156) in order to validate the Automatic Parking Brake release command.

34. Device according to one of Claims 23 to 33, characterized in that it contains a circuit (160-172) for detecting the engaged or disengaged state of the power unit by means of a plurality of maps (163, 164) containing a series of transmitted torque estimation values (ECT) dependent on the degree of depression of the accelerator pedal established according to whether the clutch is active or not, by means of an AND gate (171) for validating production of the Automatic Parking Brake release command depending on the type of driver, degree of depression of the accelerator pedal (THETA_Acc) and transmitted torque estimation (ECT), an AND gate (171) validating the Automatic Parking Brake release command.

35. Device according to one of Claims 23 to 34, characterized in that it contains a circuit (180 – 195) for detecting the idle state of the vehicle according to the direction of rotation, which involves two generators (181, 182) of a function determining the idle engine speed, connected to two comparators (190, 191) of the instantaneous value of the engine speed (W_m), and two AND gates (192, 193) for validating an Automatic Parking Brake release command.

36. Device according to one of Claims 23 to 35, characterized in that it contains a circuit (200 – 206) for determining a state of saturation of the thermal engine including a comparator (201) for determining whether the engine speed (W_m) and for applying or not a corrected value in a means of correction (202, 203) of estimated torque values (C_{me}).

37. Device according to one of Claims 23 to 36, characterized in that it contains a circuit for use of a “horizontal” starting operation, which comprises essentially:

- a circuit for activating the horizontal starting operation on configuration of the vehicle on production, maintenance or on detection of the type of driver or of the driver when the latter sits down in the vehicle, which produces a logic signal at “0” if the operation is not implemented and at “1” if the operation is implemented;

- a "horizontal" position detection circuit in order to detect that the signal representing the angle of inclination produced by the slope angle sensor (7) is at absolute value less than a threshold value registered in a suitable register and representing the "horizontal" position limit;
- a first AND gate to combine the output signals of the circuit for activating the horizontal starting operation and the "horizontal" position detection circuit;
- a circuit for elaborating the variable Acc_Was_NonZero which comprises a comparator of the degree of depression of the accelerator pedal at a very low predetermined depression threshold and a reset circuit as soon as the Idle variable coming from the rest of the starting device of the invention returns to "0";
- a circuit to test the value of the transmitted torque estimation ECT coming from the rest of the starting device of the invention at a threshold value ECTthreshold and to produce a release command of the Automatic Parking Brake;
- a second AND gate for combining the "horizontal" release command coming from the circuit to test the value of the transmitted torque estimation ECT at the output for the first AND gate and the output of which is connected to the electric motor controller of the Automatic Parking Brake.

38. Device according to one of Claims 23 to 37, characterized in that it contains a circuit for use of a starting operation on descent in first gear, which includes:

- a circuit for activating the starting operation "on descent in first gear," upon configuration of the vehicle on production, maintenance or upon detection of the type of driver or of the

driver when the latter sits down in the vehicle, which produces a logic signal at "0" if the operation is not implemented and at "1" if the operation is implemented;

- a circuit for detection of "descent in first gear," in order to detect that the signal representing the angle of inclination produced by the angle of slope sensor 7 is greater than a positive threshold value registered in a suitable register and representing the limit of "descent in first gear";
- a third AND gate for combining the output signals of the circuit for activating the starting operation "on descent in first gear" and of the circuit for detection of "descent in first gear";
- a fourth AND gate for combining the output of the third AND gate and the output of the circuit for testing the value of the transmitted torque estimation ECT coming from the rest of the starting device of the invention at a threshold value $ECT_{threshold}$ and for producing a release command of the Automatic Parking Brake "on descent in first gear".

39. Device according to one of Claims 23 to 38, characterized in that it contains a circuit for use of a starting operation on descent in "reverse", which comprises:

- a circuit for activating the starting operation "on descent in reverse gear," upon configuration of the vehicle on production, maintenance or upon detection of the type of driver or of the driver when the latter sits down in the vehicle, which produces a logic signal at "0" if the operation is not implemented and at "1" if the operation is implemented;
- a circuit for detection of "descent in reverse gear", in order to detect that the signal representing the angle of inclination produced by the angle of slope sensor 7 is greater than a positive threshold value registered in a suitable register and representing the limit of "descent in reverse gear";

- a third AND gate for combining the output signals of the circuit for activating the starting operation "on descent in reverse gear" and of the circuit for detection of "descent in reverse gear";
- a fourth AND gate for combining the output of the third AND gate and the output of the circuit for testing the value of the transmitted torque estimation ECT coming from the rest of the starting device of the invention at a threshold value $ECT_{threshold}$ and for producing a release command of the Automatic Parking Brake "on descent in reverse gear".

40. Device according to one of Claims 23 to 39, characterized in that it contains a circuit for detecting excess pitch, the output of which is active if the excess pitch exceeds a threshold predetermined in a register, the output of the circuit for detecting excess pitch being combined by a reversing input of an AND gate, another input of which is connected to the output of the device previously described, on which is located the release command of the Automatic Parking Brake, and the output of the AND gate producing the release command of the Automatic Parking Brake outside of excess pitch.

41. Device according to Claim 40, characterized in that the circuit for detecting excess pitch contains an input terminal that receives a signal produced by the angle of slope sensor (7), which presents sufficient resolution for detecting excess pitch, transmitted to the input of a circuit for producing a signal representing the time derivative of the angle of inclination detection signal, the output of which is connected to an input of a comparator, the other input of which is connected to a register maintaining an excess pitch threshold value. The output of the comparator is active when the derivative of the signal representing the angle of inclination of the sensor 7 is greater than the predetermined threshold.

42. Device according to Claim 41, characterized in that it contains a generator of excess pitch threshold values as a function of the angle of inclination produced by the sensor (7) in order to produce the excess pitch threshold value.

43. Device according to Claim 42, characterized in that the generator of excess pitch threshold values contains a first series of threshold values in a first starting direction and a second series of threshold values in a second starting direction.

44. Device according to one of Claims 23 to 43, characterized in that it contains a circuit for producing an operation of anticipation of the dynamics of starting, which comprises a circuit for calculating the time derivative D_Acc of the signal $Teta_Acc$ of the degree of depression supplied by the angle of slope sensor (7; Figure 1) connected to a first input of a comparator, the other input of which is connected to a generator of a predetermined $Threshold_Anticipate$ value, so that its output is active if the $Threshold_Anticipate$ value is exceeded, wherein the output signal of the comparator is then transmitted to a first input of another AND gate, the second input of which is connected to a circuit for detecting that the transmitted torque estimation ECT is in the process of incrementation, for example, by detecting the evolution of the counter CPTR (83, Figure 6), and the output of the other AND gate is then used as anticipated release command of the Automatic Parking Brake.

45. Device according to Claim 44, characterized in that it also contains a generator of a predetermined threshold $Threshold_Anticipate$ in the form of a table of threshold values addressed by the value of the degree of slope measured by the angle of slope sensor (7), the $Threshold_Anticipate$ value then being transmitted to the aforementioned comparator.

46. Device according to one of Claims 23 to 46, characterized in that it also contains a circuit for taking into account the response time of the Automatic Parking Brake and the

dynamism of the driver with an anticipation or prediction (ECT_predicted) on the transmitted torque estimation (ECT), which involves:

- a prediction operator for executing an operation of the form: $ECT_predicted(Tr) = ECT + Tr \times (d/dt).ECT$, in which Tr is a characteristic value of response time of the electromechanical system and the time derivative ((d/dt).ECT) on the transmitted torque estimation is an estimation of the driver's dynamism;
- a prediction test operator on the transmitted torque estimation (ECT_predicted) to at least one release test threshold (S_min_predicted and/or S_max_predicted) with predetermined anticipation, registered and/or calibratable in a memory, so that an anticipated release command of the Automatic Parking Brake will be produced if the test operator is activated.

47. Device according to one of Claims 23 to 46, characterized in that it consists of a processor with a logic architecture in four blocks:

- an acquisition block of input data, among which are the engine speed Wm, the speed of the vehicle Vv, the angle of slope, the estimated average torque Cme, and the degree of depression of the accelerator pedal THETA_Acc, notably sampled on the CAN (1) bus;
- a signal treatment block applied to input data, particularly carrying out digital filtering of all or part of the input data and making scale or unit corrections;
- a block for initialization of the parameters of the method of the invention, involving notably the threshold values and initializations of the counters;
- a block for execution of the method according to one of Claims 1 to 22 in order to generate a release command of the Automatic Parking Brake.